#21 Declaration S. Bryce 1/12/04

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Customer No.: 07278
PATENT TRADEMARK OFFICE

Docket No: 1527/0E847

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Arthur ASHMAN

Serial No.: 09/448,692 Art Unit: 3738

Confirmation No.: 5329

Filed: November 24, 1999 Examiner: D. Isabella

For: SOFT TISSUE SUBSTITUTE AND METHOD OF SOFT TISSUE REFORMATION

DECLARATION UNDER 37 C.F.R. §1.132 OF ARTHUR ASHMAN

Commissioner for Patents
Washington, DC 20231

Sir:

I, **Arthur Ashman**, hereby declare:

1. I am the named inventor and sole owner of United States Patent Application No. 09/448,692, filed November 24, 1999. The subject of my application is my invention of soft tissue substitutes and methods of soft tissue reformation. I make this declaration pursuant to 37 C.F.R. § 1.132 in support of the patentability of the claims in my application.

2. I received my D.D.S. degree in 1961 from the Columbia University School of Dental and Oral Surgery, New York, NY and practiced for over thirty-five years as a board-certified dentist specializing in Oral Surgery and Rehabilitative Dentistry in conjunction with dental implant placement. I founded the Arthur Ashman Department of Implant Dentistry at New York University College of Dentistry, New York, NY, and have held the position of Professor of Dentistry there since 1991. I have also held several other appointments at academic and medical institutions, including as Head of Dental Research at the Mt. Sinai Research Center, New York, NY. I have authored over eighty papers and given over 500 lectures and seminars in more than twenty countries on the subjects of implants and bone substitutes.

3. The United States Patent and Trademark Office has awarded me twelve (12) patents relating to implants and bone substitutes, and I have received over two dozen patent grants from foreign patent offices.

4. I am a named inventor in United States Patent No. 4,547,327 (Bruins et al.). Bruins et al. discloses and claims a formed structurally rigid porous implantable oral prosthesis and method of manufacture. The prosthesis consists of polymeric particles, which may be composed of polymethylmethacrylate (PMMA) coated with polymerized hydroxyethylmethacrylate (PHEMA), sintered into a desired shape prior to implantation (e.g., a tooth root, chin, cheek, skull plate, etc.). A portion of the sintered prosthesis may have pores that allow, but do not induce, soft-tissue ingrowth into the surface of the prosthesis structure for use in areas such as where the prosthesis (in bone) interfaces with soft tissue (e.g., gum or mouth gingiva).

5. Bruins et al. does not disclose a particulate soft tissue implant, i.e., an implant in soft tissue only that is in particulate (not bonded or sintered) form.

6. I am a named inventor in United States Patent No. 4,728,570 (Ashman et al.). Ashman et al. discloses a porous hard tissue implant material composed of polymeric particles (composed of PMMA, PHEMA) coated with calcium hydroxide. The pores are of sufficient size to permit hard tissue (e.g., bone) to grow into the pores. The implant material is in granular form that permits it to be packed into hard tissue (but not soft tissue) in the body.

7. Ashman et al. discloses that when the calcium hydroxide form is placed in hard tissue (bone), it promotes or induces hard tissue ingrowth into and around the pores of the implant. In hard tissue, calcium hydroxide, which is mixed with bleeding marrow from the bone surgical site, transforms to calcium carbonate-apatite. Calcium carbonate-apatite promotes new hard tissue (bone) growth. The calcium carbonate-apatite also acts in hard tissue to raise pH (to alkaline), facilitating healing and reducing risk of infection.

8. Ashman et al. does not disclose use of calcium hydroxide in soft tissue implants. In soft tissue procedures, arterial or capillary blood has mature blood cells. But in bone bleeding, the bone marrow is composed of immature pleuripotential stem cells (not mature cells). Calcium hydroxide does not transform to calcium carbonate-apatite in the presence of capillary (soft tissue) bleeding in soft tissue.

9. I am also a named inventor in U.S. Patents Nos. 4,199,864, 4,244,689, 4,535,485, 4,536,158 and 4,547,390, the subject matters of which have been made of

record in my application. These patents disclose polymeric implants and implant materials for bone or hard tissue replacement. However, none disclose either polymeric particulate soft tissue implants or use of calcium hydroxide in soft tissue implants.

10. My current application claims, *inter alia*, soft tissue implant materials comprising non-resorbable polymeric particles having a coating of calcium hydroxide (which does not form calcium carbonate apatite) with interstices between the particles sized to permit soft tissue ingrowth. This material, when placed in soft tissue, does not produce or induce bone or hard tissue growth as it does when placed in hard tissue (bone). These claims are based on my discovery that calcium hydroxide coated polymeric particles (e.g., PMMA-PHEMA) induce soft tissue ingrowth when placed within soft tissue (with no surface change to carbonate), including stimulation of collagen production (soft tissue) by the body (compared to bone produced when placed in a bone defect adjacent to existing bone).

11. Prior to my invention, I did not know or expect that calcium hydroxide coated polymeric (e.g., PMMA-PHEMA) particles would not only allow but induce soft tissue growth when used in soft tissue sites. Further, due to the differences between hard body tissues and soft body tissues (physiological, chemical, etc.), and that calcium hydroxide does not transform to a calcium carbonate-apatite surface in soft tissue (as it does in hard tissue to promote bone or hard tissue growth), I would not have expected that this

combination of components would promote soft tissue growth in soft tissue sites. Thus, my invention achieves unexpected results.

12. My application also claims, *inter alia*, a particulate soft tissue implant having an inner core comprised of PMMA and an outer layer comprised of PHEMA, with interstices between the particles sized to permit soft tissue ingrowth. These claims are based on my discovery that this particulate material, i.e., in non-bonded or sintered form, would function as a soft tissue implant. Prior to my invention, I did not know or expect that this particulate material would function as a soft tissue implant.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Norwalk, Connecticut this 13th day of September, 2002.

Arthur Ashman